MATH116: QUIZ VII

Name:
Student Number:
Section: 2
Date: June 27, 2007

Question:
Evaluate the triple integral

$$\int\int\int_D x^2 \sin(\pi z) dV$$

where $D = \{(x, y, z) \in R^3 \mid 0 \leq y \leq 1 - z,\ 0 \leq z \leq 1,\ 0 \leq x \leq 2\}$

Solution:

$$\int\int\int_D x^2 \sin(\pi z) dV = \int_0^2 \int_0^1 x^2 \sin(\pi z)\,(1 - z) dz\, dx$$

$$= \int_0^2 x^2 \,[-\frac{1}{\pi}\cos(\pi z) + \frac{1}{\pi} z \cos(\pi z) - \frac{1}{\pi^2}\sin(\pi z)]|_0^1\, dx = \frac{1}{\pi}\int_0^2 x^2\, dx = \frac{8}{3\pi}$$